

# Test Report

## Comparison Testing of 230mm Diamond Blades

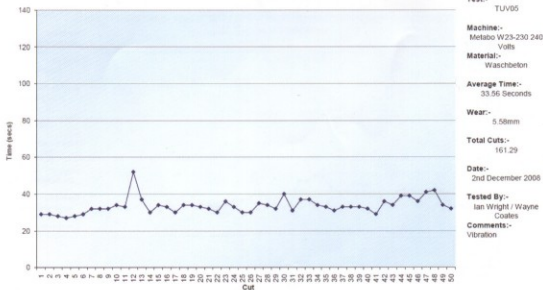


### Product Service

With over 50 years' experience, TÜV Product Service Ltd is a leading international expert providing testing, certification, qualification and market access services to a range of industries covering the defence, aerospace, transportation, telecommunications, IT, consumer, retail and medical sectors.

TÜV Product Service Ltd provides independent unbiased services and has no association or affiliation to any other business that could compromise its integrity.

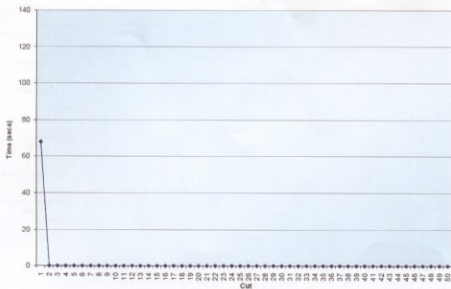
Graph to show Tyrolit Universal Premium Ø230mm x 12mm Segment Cutting Times  
50 Cuts in Waschbeton



Graph to show Mi750 Marcrisr New No WC Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



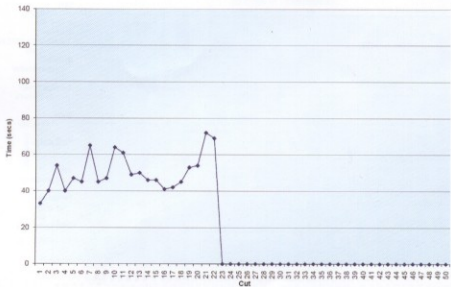
Graph to show Diewa TC-L Ø230mm x 7mm Segment Cutting Times  
1 Cut in Waschbeton



Test:- TUV07  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 68 Seconds  
 Wear:- #VALUE!  
 Total Cuts:- 1.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 1 cut

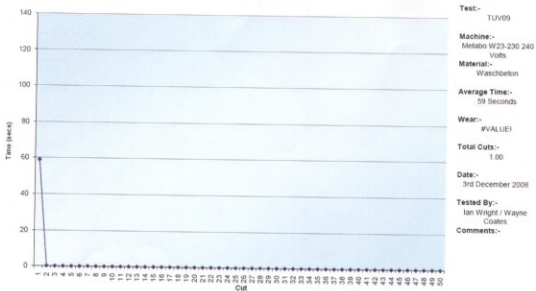
Graph to show Bosch Professional Plus 352 Ø230mm x 7mm Segment Cutting Times  
22 Cuts in Waschbeton



Test:- TUV08  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 50.36 Seconds  
 Wear:- 0.58mm  
 Total Cuts:- 22.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:- Vibration

The blade stopped cutting after 22 cuts

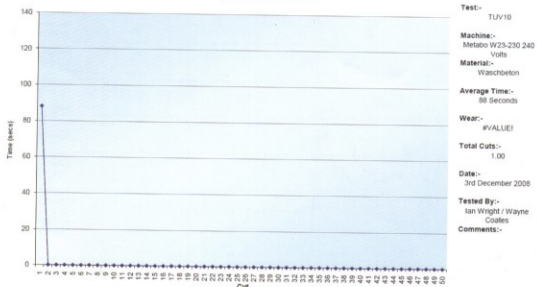
Graph to show Husqvarna MT15 Meteor Ø230mm x 7mm Segment Cutting Times  
1 Cut in Waschbeton



Test:- TUV09  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 59 Seconds  
 Wear:- #VALUE!  
 Total Cuts:- 1.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 1 cut

Graph to show Dronco Quality ST 7 Ø230mm x 7mm Segment Cutting Times  
1 Cut in Waschbeton



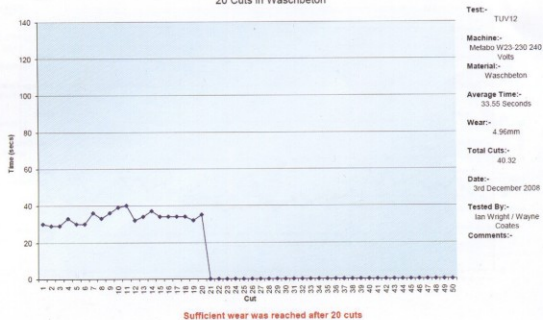
Test:- TUV10  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 88 Seconds  
 Wear:- #VALUE!  
 Total Cuts:- 1.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 1 cut

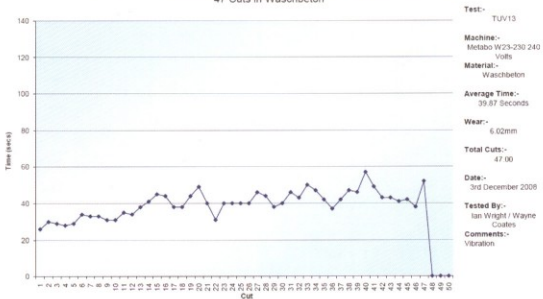
Graph to show Tyrolit Universal Fast Cut Basic Ø230mm x 8mm Segment Cutting Times  
25 Cuts in Waschbeton



Graph to show Bosch Professional Eco Ø230mm x 8mm Segment Cutting Times  
20 Cuts in Waschbeton

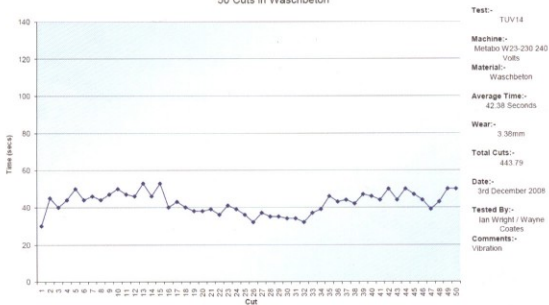


Graph to show Diewe D960 Plus Ø230mm x 10mm Segment Cutting Times  
47 Cuts in Waschbeton



The blade stopped cutting after 47 cuts

Graph to show Shoux XR20 Samedia Ø230mm x 20mm Segment Cutting Times  
50 Cuts in Waschbeton



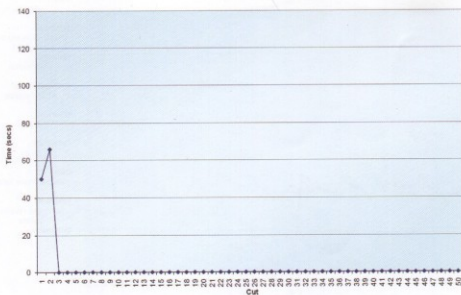
Graph to show Norton Clipper Classic Jet Ø230mm x 10mm Segment Cutting Times  
25 Cuts in Waschbeton



Graph to show Rothermberger Red Professional Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



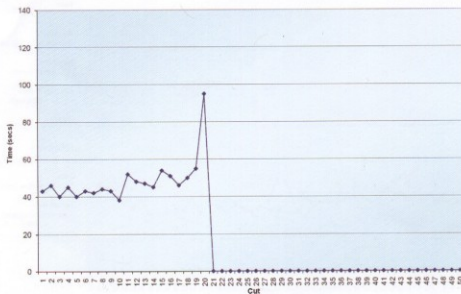
Graph to show Bosch Professional Plus 678 Ø230mm x 9mm Segment Cutting Times  
2 Cuts in Waschbeton



Test:- TUV17  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 58 Seconds  
 Wear:- #VALUE!  
 Total Cuts:- 2.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 2 cuts

Graph to show RS Laser Diamant Stabil-Runner Ø230mm x 8mm Segment Cutting Times  
20 Cuts in Waschbeton



Test:- TUV18  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 48.95 Seconds  
 Wear:- 2.2mm  
 Total Cuts:- 20.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 20 cuts



Graph to show Edge Sintered Sitemaster Trade Segmented Ø230mm x 10mm Segment Cutting Times  
17 Cuts in Waschbeton



The blade stopped cutting after 17 cuts

Test:- TUV19  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 72.76 Seconds  
 Wear:- 1.54mm  
 Total Cuts:- 17.00  
 Date:- 2nd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

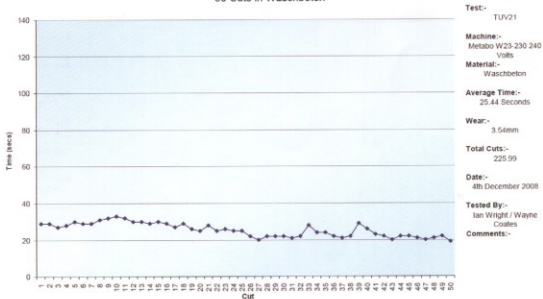
Graph to show Spectrum Cyclone ZCX Ø230mm x 10mm Segment Cutting Times  
15 Cuts in Waschbeton



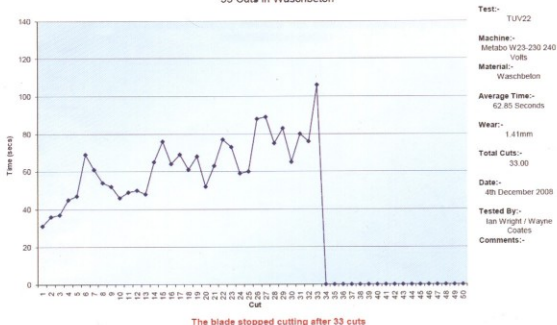
The blade stopped cutting after 15 cuts

Test:- TUV20  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 60.6 Seconds  
 Wear:- 0.61mm  
 Total Cuts:- 15.00  
 Date:- 3rd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

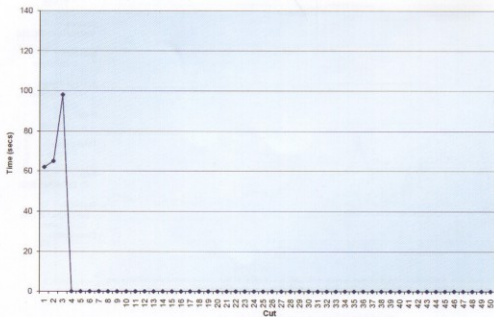
Graph to show Mi850 Marcrist C15 Ø230mm x 11mm Segment Cutting Times  
50 Cuts in Waschbeton



Graph to show Dronco Evolution Express Ø230mm x 7mm Segment Cutting Times  
33 Cuts in Waschbeton



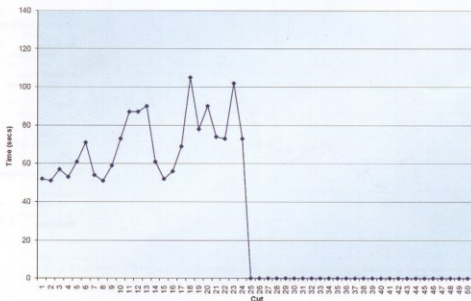
Graph to show Husqvarna VN30 Vega Ø230mm x 11mm Segment Cutting Times  
4 Cuts in Waschbeton



Test:- TUV23  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 75 Seconds  
 Wear:- #VALUE!  
 Total Cuts:- 4.00  
 Date:- 4th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 4 cuts

Graph to show Norton Clipper Euro ZML Evo Service Line Ø230mm x 10mm Segment Cutting Times  
24 Cuts in Waschbeton



Test:- TUV24  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 69.96 Seconds  
 Wear:- 2.21mm  
 Total Cuts:- 24.00  
 Date:- 4th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

The blade stopped cutting after 24 cuts



## Test Report – Diamond Cutting Blades Comparison Testing

**Report No:** 75905129 **Issue Date:** 2008-12-18

**Client:** Marcris International Ltd,  
Kirksandel Industrial Estate,  
Doncaster,  
DN3 1QR **Date of Comparison testing:** 2008-12-02 to 2008-12-10

**Product:** Diamond Cutting Blades **Model No :-** ➤ Marcris Standard Products.  
**Various :-** ➤ Competitor blades purchased on open market.

**Purpose of test:** To carry out application related testing on diamond blades based on typical working conditions using standard material and machine with manual operation.

This method was employed to give a true indication of the characteristics of the blade when used in real working conditions.

To minimise the influence of the operator on all blades tested, two operators were employed, one to perform the first 25 cuts and a different operator to perform the second 25 cuts.

**Summary:** TÜV Product Service were commissioned by Marcris International Ltd to witness comparison testing conducted on various types of Diamond Blades to provide an independent verification of the results.

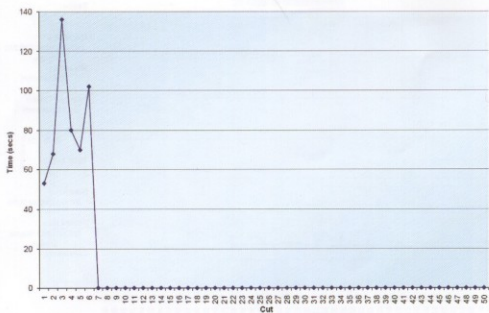
**Prepared by:**

Robert Brash  
Product Safety Specialist

**Reviewed by:**

Mark Penton  
Senior Consultant

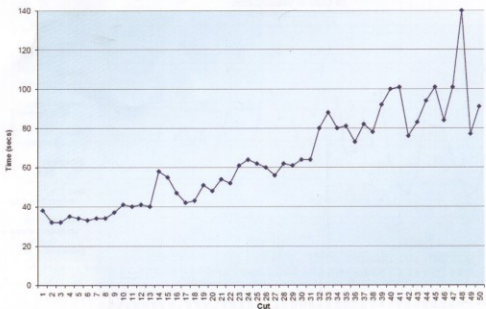
Graph to show Spectrum DE10 Ø230mm x 10mm Segment Cutting Times  
6 Cuts in Waschbeton



The blade stopped cutting after 6 cuts

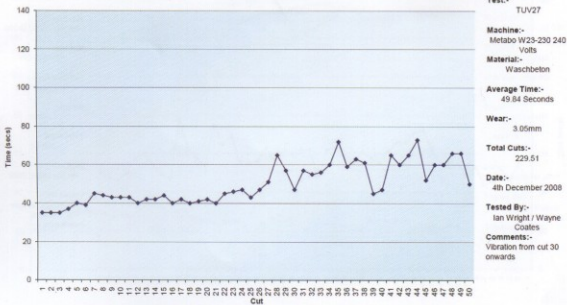
Test:- TUV25  
 Machine:- Metabo W23-230 240  
 Volts  
 Material:- Waschbeton  
 Average Time:- 84.83 Seconds  
 Wear:- 1.96mm  
 Total Cuts:- 6.00  
 Date:- 4th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

Graph to show Turbolite T152 Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton

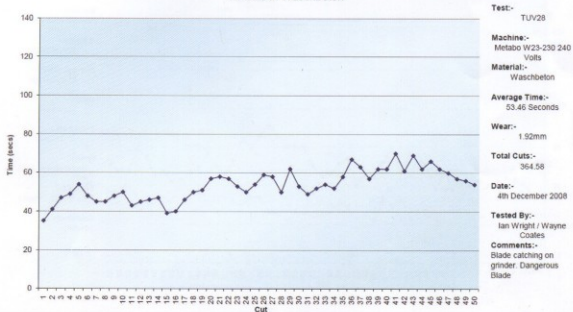


Test:- TUV26  
 Machine:- Metabo W23-230 240  
 Volts  
 Material:- Waschbeton  
 Average Time:- 63.54 Seconds  
 Wear:- 1.25mm  
 Total Cuts:- 50.00  
 Date:- 4th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

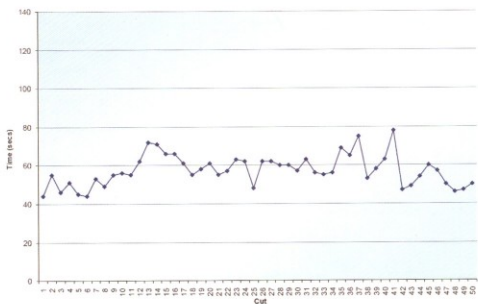
Graph to show Spectrum Superfast Superior TX10R Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



Graph to show Edge Sitemaster Turbo (Dangerous Blade) Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton

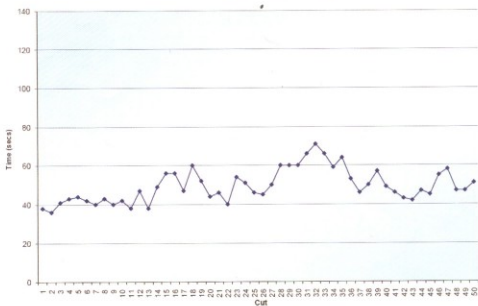


Graph to show Diewe Twister Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



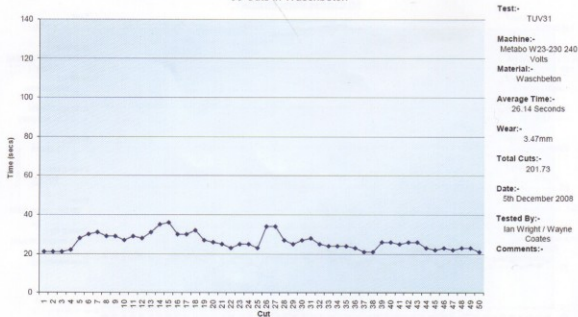
Test:- TUV29  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 57.24 Seconds  
 Wear:- 1.98mm  
 Total Cuts:- 303.54  
 Date:- 5th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

Graph to show Master Drive Diewe Turbo Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton

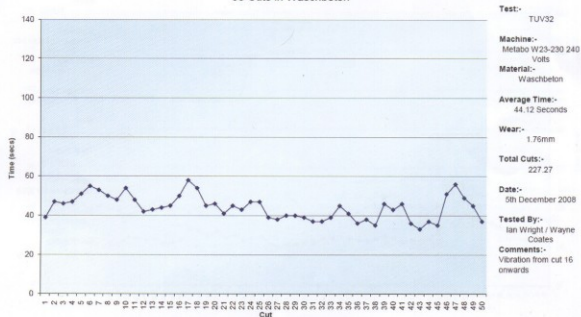


Test:- TUV30  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 49.4 Seconds  
 Wear:- 6.06mm  
 Total Cuts:- 115.51  
 Date:- 5th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:- Vibration

Graph to show Mister Cut Turbo New Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton

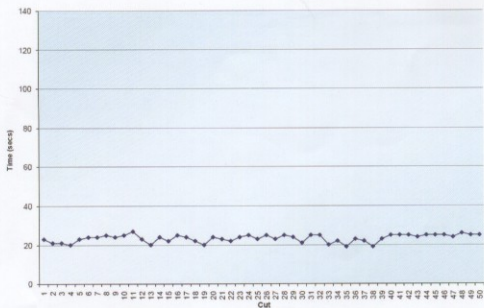


Graph to show Diewe Power Twister Ø230mm x 7mm Segment Cutting Times  
50 Cuts in Waschbeton



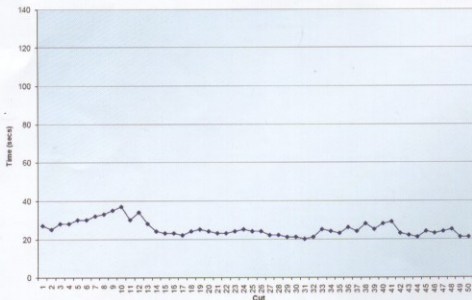


Graph to show Eco Laser Ø230mm x 8mm Segment Cutting Times  
50 Cuts in Waschbeton



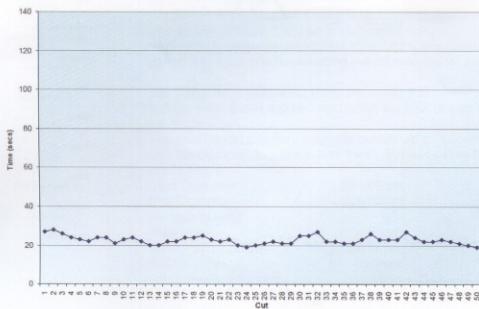
Test:- TUV33  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 23.36 Seconds  
 Wear:- 2.48mm  
 Total Cuts:- 201.61  
 Date:- 5th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

Graph to show Mister Cut Hurricane New Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



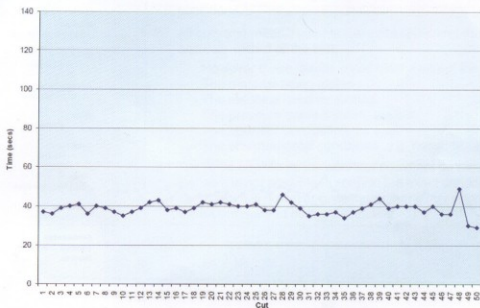
Test:- TUV34  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 25.36 Seconds  
 Wear:- 4.27mm  
 Total Cuts:- 163.93  
 Date:- 5th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

Graph to show Marcrist Short - Best Ø230mm x 11mm Segment Cutting Times  
50 Cuts in Waschbeton



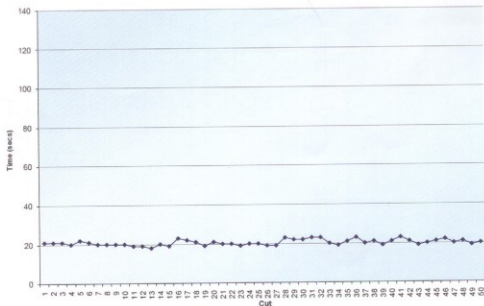
Test:- TUV35  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 22.76 Seconds  
 Wear:- 3.57mm  
 Total Cuts:- 224.09  
 Date:- 5th December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

Graph to show Fuhrer & Bachmann WW-T Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



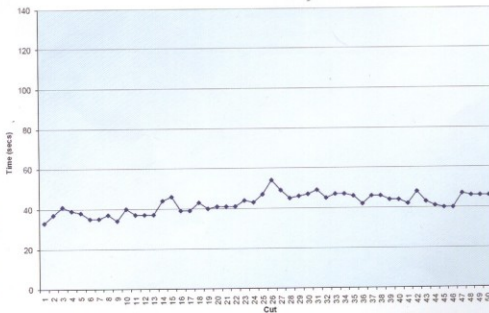
Test:- TUV36  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 38.78 Seconds  
 Wear:- 7.22mm  
 Total Cuts:- 96.95  
 Date:- 5th December 2008  
 Tested By:- Ian Wright  
 Comments:-

Graph to show BF750 Marcrisr Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



Test:- TUV37  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 20.54 Seconds  
 Wear:- 2.74mm  
 Total Cuts:- 255.47  
 Date:- 8th December 2008  
 Tested By:- Ian Wright  
 Comments:-

Graph to show Nozar Red Devil Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



Test:- TUV38  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 42.48 Seconds  
 Wear:- 4.28mm  
 Total Cuts:- 163.55  
 Date:- 8th December 2008  
 Tested By:- Ian Wright  
 Comments:- Vibration from cut 25 onwards

### Summary

**Collation of results:-**

Using Microsoft Excel, the measured sizes and number of cuts were entered into the spreadsheet.

The speed of the blade is shown in seconds.

The life of the blade is shown in number of cuts.

All tested blades were numbered, these numbers relate to the graphs in this report with each graph containing the information for each blade.

The blade life is calculated using the amount of wear measured over the number cuts; this is extrapolated using the total usable segment height of the blade.

The total usable segment height is calculated as follows, segment height, less the diamond free zone, less 1 mm. In most cases this equals 3mm.

For example:

Start Diameter	230.00mm
End Diameter	226.00mm
Number of Cuts	50
Total Wear	4.0mm
Wear Per Segment	2.0mm
Segment Height	10.0mm
Total Usable Segment	$10.0\text{mm} - (2+1) = 7.0\text{mm}$

So to calculate the life:

Life = (Total Usable Segment ÷ Wear Per Segment) x Number of Cuts

Life =  $7 \div 2 \times 50 = 175$  Cuts

**TÜV Comments on the testing**

1. The comparison testing was conducted under one common set of conditions.
2. All cuts and measurements were observed and the results are an accurate record of the test.
  - However these results could differ if any of the following are varied:
    - The material being tested.
    - The machine used for testing.
    - The pressure applied during the cut.
    - The operator conducting the test.
    - The environmental conditions, e.g. humidity, temperature etc
3. The force applied by the operator could not be measured during the test so it is not possible to confirm the exact conditions applied during each cut. It is however considered that every effort was made to use a consistent method during the testing.



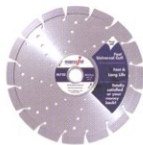
Samples of  
Marcris  
Standard  
Products.



Mister Cut Universal



BF 850



Mi750



Mi850



Turbolite T152



Mister Cut Turbo New



Eco laser



Mister Cut Hurricane New

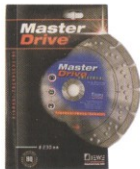


Short best



BF 750

Samples of  
Competitor  
blades  
purchased on  
open market.



Diewe Master Drive



Tyrolit Fast Cut



Tyrolit Universal Premium



Diewe TC-L



Bosch Professional Plus



Husqvarna MT15 Meteor



Dronco Quality ST 7



Tyrolit Universal Fast Cut



Bosch Professional Eco



Diewe D960 Plus



Shoxx XR20 Samedia



Norton Clipper classic Jet

Samples of  
Competitor  
blades  
purchased on  
open market.



Rothenberger Red  
Professional



Bosch Professional  
Plus



RS Laser Diamant  
Stabil Runner



Sitemaster Trade  
Segmented



Spectrum Cyclone  
ZCX



Dronco Evolution  
Express



Husqvarna VN 30 Vega



Norton Clipper Euro  
ZML Evo Service Line



Spectrum DE10



Spectrum Superfast  
Superior TX10R



JCB Sitemaster Turbo



Diewe Twister



Samples of  
Competitor  
blades  
purchased on  
open market.



Master Drive Dewe Turbo




Dewe Power Twister



Führer + Bachmann  
WW-T Dream Team



Nozar Red Devil

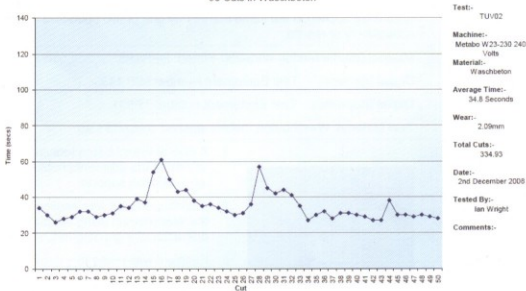
<b>Test Method</b>	
<b>Testing conducted</b>	<p>To compare the performance of popular diamond blades, by establishing the speed of the cut and the lifetime of the blade:-</p> <p>Test Blades used:-</p> <p>Marcrisr Standard Products. Competitor blades purchased on open market, packaging opened in presence of TÜV Product Service.</p> <p>See results for details of blades tested:-</p>
<b>Test Protocol</b>	<p>Each Blade was tested under the same conditions as described in the method below to establish the average cut time with each type.</p> <ol style="list-style-type: none"> <li>1. Each Blade diameter was measured before use using vernier callipers and result recorded.</li> <li>2. Each Blade was subjected to a maximum of 50 cuts at 500mm long x 50mm deep (or until the blade would not cut).</li> <li>3. Time of each cut was recorded.</li> <li>4. On completion of test the diamond blade was measured and the result recorded.</li> <li>5. The same machine was used on all cuts.</li> <li>6. Material of the same grade was used for all cuts.</li> <li>7. The same operators were used for all cuts.</li> <li>8. The position of the material being cut was the same for all cuts.</li> <li>9. No blades were sharpened either before or during the test. If any blade-stopped cutting due to segment glazing, blade core detentioning or excessive segment wear, the test was ended.</li> </ol> <p>The testing was applied using manual operation of a grinding machine. All tests were applied in the same manner by one of two operators to ensure consistency of results.</p>
<b>Test Equipment</b>	<p>Metabo Grinder model, W23-230, Rated: 240Volts.</p> <p>Digital Verniers. Test Equipment Number MIP 143,</p> <p>Digital Stopwatch. Test Equipment number TE931,</p> <p>Test Material. Waschbeton, pebble-dashed concrete slab,</p>
<b>Test Method</b>	<div style="display: flex; align-items: flex-start;">  <div style="margin-left: 20px;"> <ol style="list-style-type: none"> <li>1. A slab of Waschbeton (concrete slab) as shown in the adjacent photo was mounted on a wooden support.</li> <li>2. A continuous cut was applied directly to the Waschbeton using the manual operation of a grinding machine.</li> <li>3. Each cut was made to a depth of 50mm and 500mm long.</li> <li>4. All cuts were timed using a stopwatch and the number of cuts and the time of each cut was recorded.</li> <li>5. The cuts were cut continuously until the blade was considered too blunt to cut or it became impossible to continue up to a maximum of 50 cuts.</li> <li>6. Every cut was witnessed by the TÜV Product Service Engineer.</li> </ol> </div> </div>

## Summary of Results

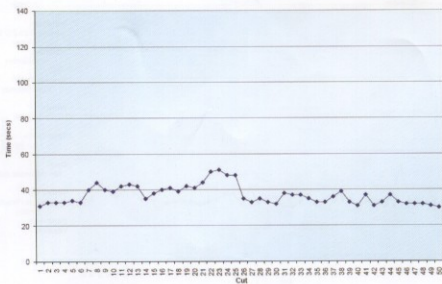
Graph to show Dieve Master Drive Universal Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton



Graph to show Mister Cut Universal New Ø230mm x 10mm Segment Cutting Times  
50 Cuts in Waschbeton

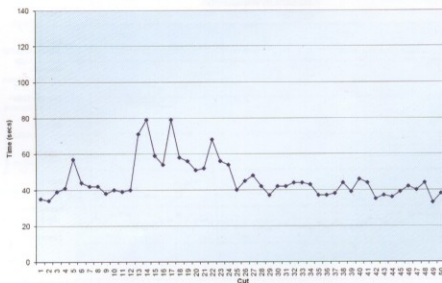


Graph to show BF850 Marcrisr WW Ø230mm x 12mm Segment Cutting Times  
50 Cuts in Waschbeton



Test:- TU/V03  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 37.04 Seconds  
 Wear:- 1.07mm  
 Total Cuts:- 641.12  
 Date:- 2nd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-

Graph to show Tyrolit Fast Cut Standard Ø230mm x 8mm Segment Cutting Times  
50 Cuts in Waschbeton



Test:- TU/V04  
 Machine:- Metabo W23-230 240 Volts  
 Material:- Waschbeton  
 Average Time:- 45.68 Seconds  
 Wear:- 3.11mm  
 Total Cuts:- 160.77  
 Date:- 2nd December 2008  
 Tested By:- Ian Wright / Wayne Coates  
 Comments:-